the t.amp

TSA 4-700, TSA 1400, TSA 2200, TSA 4000, TSA 4-300, TSA 4-1300

power amplifier

th•mann
MUSIC IS OUR PASSION

user manual

Musikhaus Thomann e. K.
Treppendorf 30
96138 Burgebrach
Germany
Telephone: +49 (0) 9546 9223-0
E-mail: info@thomann.de
Internet: www.thomann.de

04.12.2014, ID: 218912, 218913, 218915, 287602, 325986, ... (V2)

Table of contents

1 General information **4**
1.1 Further information 5
1.2 Notational conventions 6
1.3 Symbols and signal words 6
2 Safety notes **8**
3 Features **13**
4 Installation and starting up **14**
5 Connections and operating elements **15**
6 Current consumption **31**
7 Technical specifications **35**
8 Plug and connection assignment **47**
9 Cleaning **50**
10 Protecting the environment **51**

1 General information

This manual contains important instructions for the safe operation of the unit. Read and follow the safety instructions and all other instructions. Keep the manual for future reference. Make sure that it is available to all those using the device. If you sell the unit please make sure that the buyer also receives this manual.

Our products are subject to a process of continuous development. Thus, they are subject to change.

1.1 Further information

On our website (*www.thomann.de)* you will find lots of further information and details on the following points:

Download	This manual is also available as PDF file for you to download.
Keyword search	Use the search function in the electronic version to find the topics of interest for you quickly.
Online guides	Our online guides provide detailed information on technical basics and terms.
Personal consultation	For personal consultation please contact our technical hotline.
Service	If you have any problems with the device the customer service will gladly assist you.

1.2 Notational conventions

This manual uses the following notational conventions:

Letterings

The letterings for connectors and controls are marked by square brackets and italics.

Examples: *[VOLUME]* control, *[Mono]* button.

Cross-references

References to other locations in this manual are identified by an arrow and the specified page number. In the electronic version of the manual, you can click the cross-reference to jump to the specified location.

Example: See ☞ *'Cross-references' on page 6*.

1.3 Symbols and signal words

In this section you will find an overview of the meaning of symbols and signal words that are used in this manual.

Signal word	Meaning
DANGER!	This combination of symbol and signal word indicates an immediate dangerous situation that will result in death or serious injury if it is not avoided.
CAUTION!	This combination of symbol and signal word indicates a possible dangerous situation that can result in minor injury if it is not avoided.
NOTICE!	This combination of symbol and signal word indicates a possible dangerous situation that can result in material and environmental damage if it is not avoided.

Warning signs	Type of danger
	Warning – high-voltage.
	Warning – danger zone.

2 Safety notes

Intended use

This device amplifies electric audio frequency signals to operate passive speakers. Use the device only as described in this user manual. Any other use or use under other operating conditions is considered to be improper and may result in personal injury or property damage. No liability will be assumed for damages resulting from improper use.

This device may be used only by persons with sufficient physical, sensorial, and intellectual abilities and having corresponding knowledge and experience. Other persons may use this device only if they are supervised or instructed by a person who is responsible for their safety.

Safety

DANGER!

Danger for children

Ensure that plastic bags, packaging, etc. are disposed of properly and are not within reach of babies and young children. Choking hazard!

Ensure that children do not detach any small parts (e.g. knobs or the like) from the unit. They could swallow the pieces and choke!

Never let children unattended use electrical devices.

DANGER!

Electric shock caused by high voltages inside

Within the device there are areas where high voltages may be present. Never remove any covers.

There are no user-serviceable parts inside.

DANGER!

Electric shock caused by short-circuit

Always use proper ready-made insulated mains cabling (power cord) with a protective contact plug. Do not modify the mains cable or the plug. Failure to do so could result in electric shock/death or fire. If in doubt, seek advice from a registered electrician.

CAUTION!

Possible hearing damage

The device can produce volume levels that may cause temporary or permanent hearing impairment. Over an extended period of time, even levels that seem to be uncritical can cause hearing damage.

Decrease the volume level immediately if you experience ringing in your ears or hearing impairment. If this is not possible, keep a greater distance or use sufficient ear protectors.

NOTICE!

Risk of fire

Do not cover the device nor any ventilation slots. Do not place the device near any direct heat source. Keep the device away from naked flames.

NOTICE!

Operating conditions

This device has been designed for indoor use only. To prevent damage, never expose the device to any liquid or moisture. Avoid direct sunlight, heavy dirt, and strong vibrations.

NOTICE!

Power supply

Before connecting the device, ensure that the input voltage (AC outlet) matches the voltage rating of the device and that the AC outlet is protected by a residual current circuit breaker. Failure to do so could result in damage to the device and possibly injure the user.

Unplug the device before electrical storms occur and when it is unused for long periods of time to reduce the risk of electric shock or fire.

NOTICE!

Magnetic fields

The device generates strong magnetic fields that can interfere with the function of poorly shielded devices. The strongest magnetic fields are directly above and below the power amplifier. Therefore, never place sensitive devices such as pre-amplifiers, radio transmission systems, or tape decks directly above or below the power amplifier. When installing the power amplifier into a rack, you should place it in the lowest position, and further equipment such as pre-amplifiers in the highest position.

3 Features

Common features of all models described:

- integrated switching power supply
- XLR inputs
- lockable NL4 output sockets
- protective circuits
  - audio limiter
  - thermal protection
  - short circuit protection
- 19" rack-mountable (2 RU)

Find device-specific features here *Chapter 5 'Connections and operating elements' on page 15*, *Chapter 6 'Current consumption' on page 31* and *Chapter 7 'Technical specifications' on page 35*.

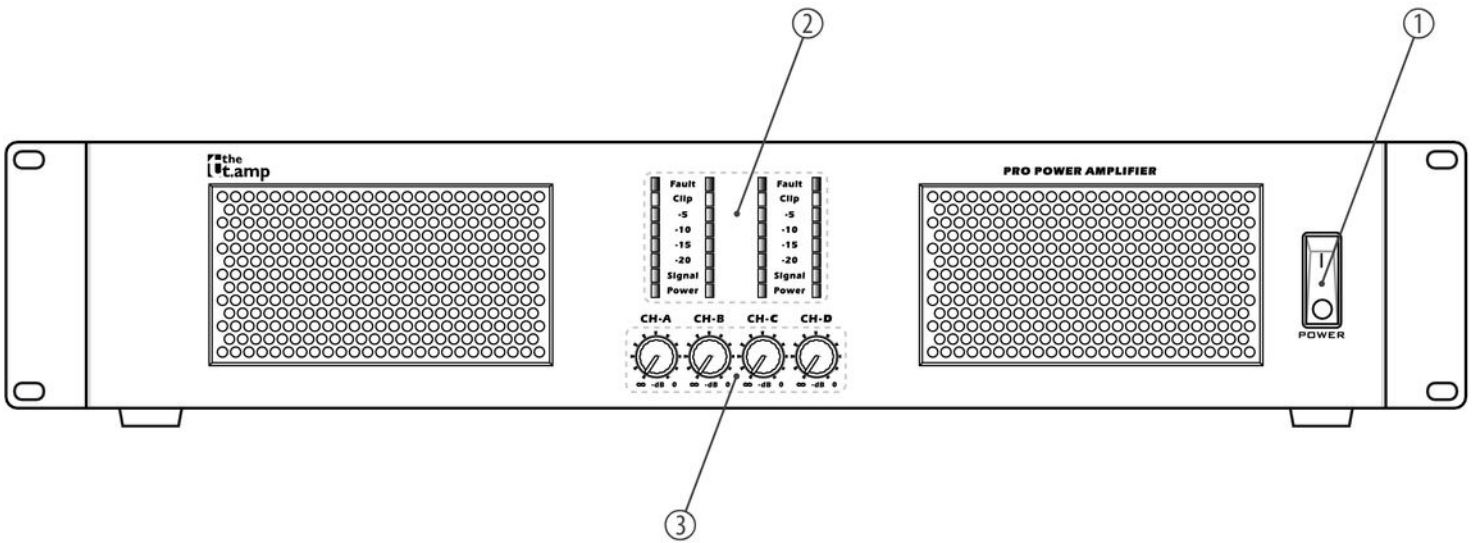
4 Installation and starting up

Unpack and carefully check that there is no transportation damage before using the unit. Keep the equipment packaging. To fully protect the device against vibration, dust and moisture during transportation or storage use the original packaging or your own packaging material suitable for transport or storage, respectively.

Establish all connections as long as the unit is switched off. Use the shortest possible high-quality cables for all connections.

5 Connections and operating elements

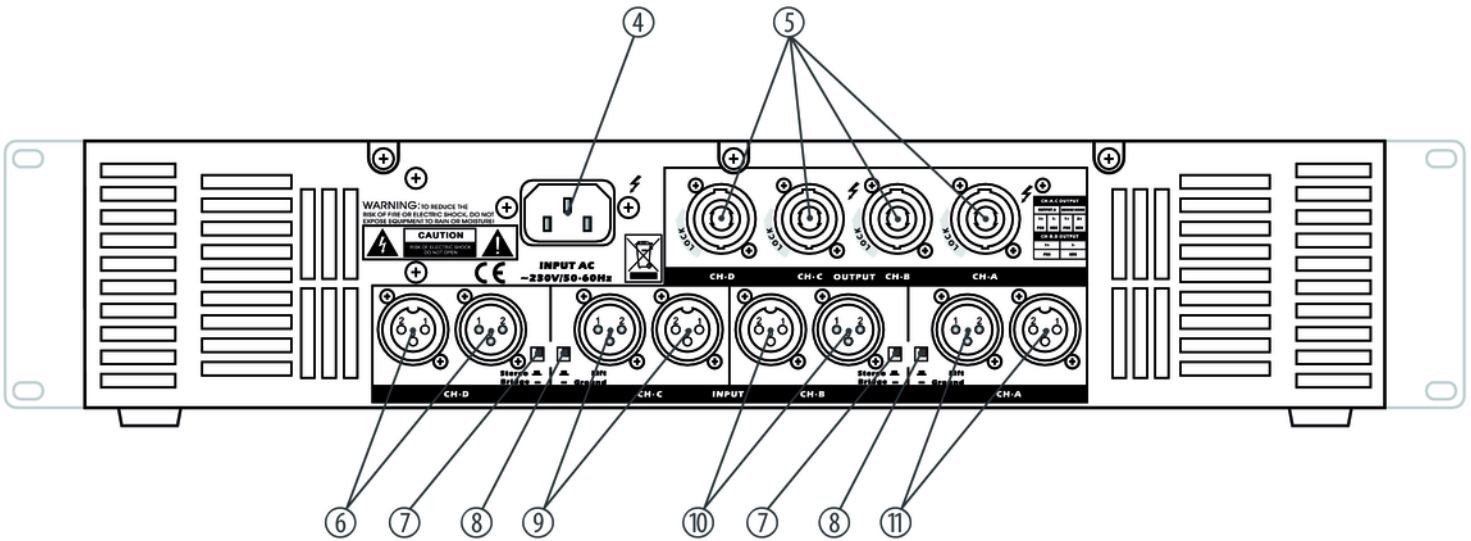
Front panel TSA 4-700



1	*[POWER]* Main switch to turn the device on and off.
2	LED indicators for *[CH-A]* … *[CH-D]* These LEDs indicate that the unit is operational (*[Power]*), the input signal level (*[Signal]* / **–20** / **–15** / **–10** / **–5**), channel overload (*[Clip]*) and a fault condition (*[Fault]*).
3	*[CH-A]* … *[CH-D]* Input gain controls for channels A to D.

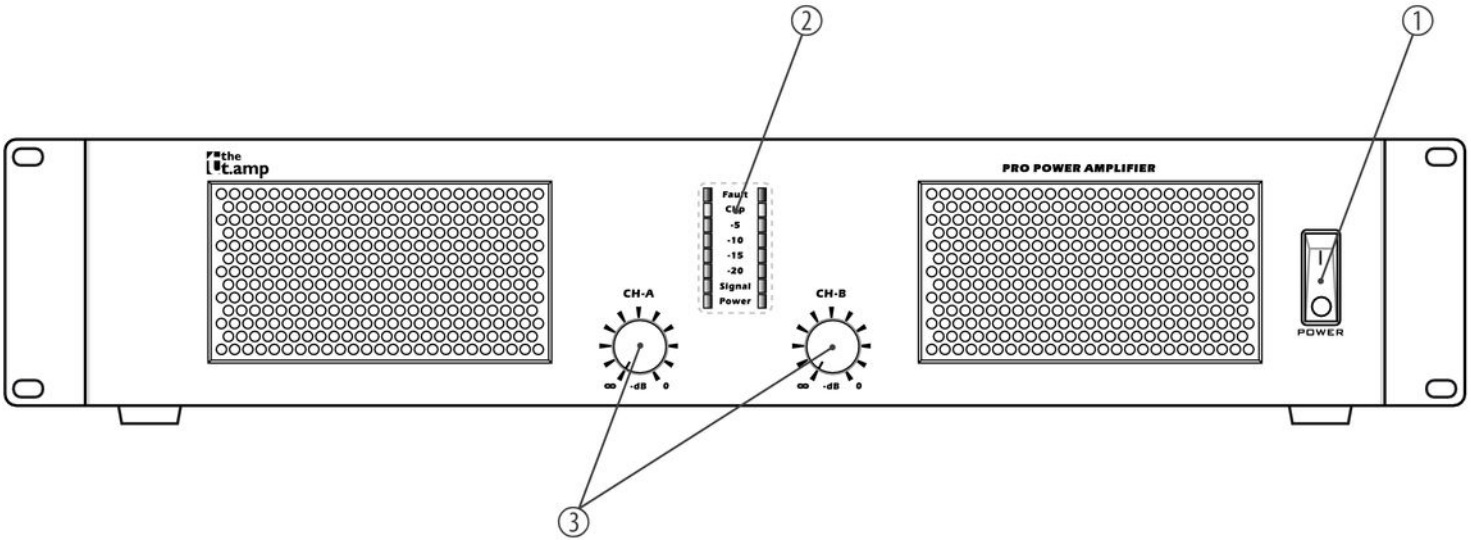
The LED [Power] lights permanently during operation. The LEDs [Signal] / [–20] / [–15] / [–10] / [–5] respond to the input signal. If any of these LEDs are lit without an input signal is present disconnect the speakers from the amplifier and turn the input gain controls of channels A to D down to minimum. If the LEDs will still light, the device must be checked by an authorized service workshop.

Rear panel TSA 4-700



4	IEC chassis plug for the power supply.
5	*[OUTPUT CH-A] … [OUTPUT CH-D]* Signal outputs, designed as lockable NL4 chassis socket to connect speakers.
6, 9, 10, 11	*[INPUT CH-A] … [INPUT CH-D]* Signal input channels, designed as XLR socket pair (input / output) to loop the audio signal to other devices.
7	Push-button *[Stereo | Bridge]* Switch for operating modes 'Stereo' (channels operate independently of each other) and 'Bridge' (two channels are interconnected to form one channel with double output).
8	Push-button *[Lift | Ground]* Use the Ground / Lift switch to separate the connection between the earth pin of the device and the unit's signal ground to prevent ground loops: ■ 'Lift' position (not pressed): no connection ■ 'Ground' position (pressed): earth pin and signal ground are electrically connected

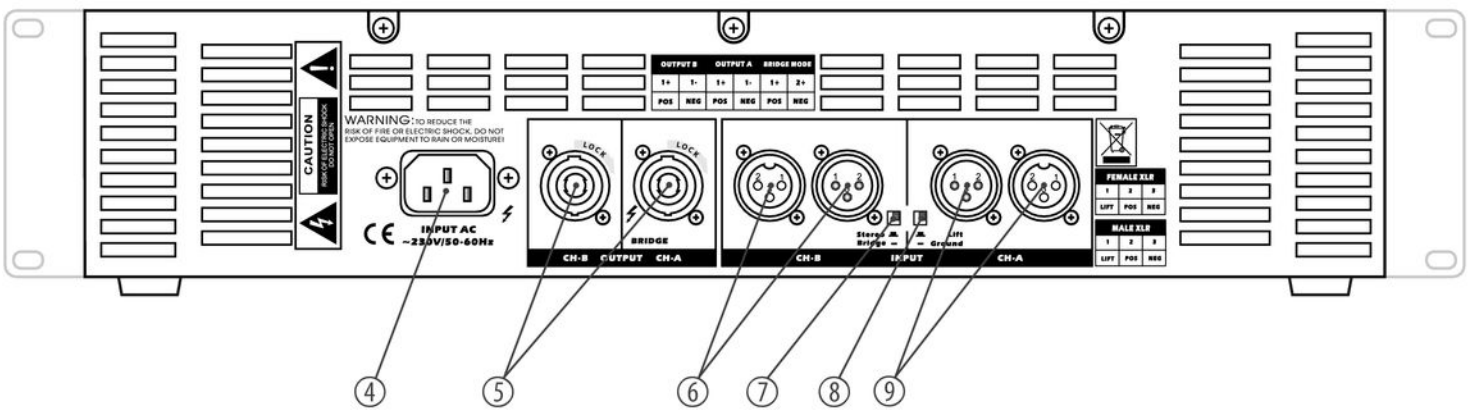
Front panel TSA 1400, 2200, 4000



1	*[POWER]* Main switch to turn the device on and off.
2	LED indicators *[CH-A]*, *[CH-B]* These LEDs indicate that the unit is operational (*[Power]*), the input signal level (*[Signal]* / **–20** / **–15** / **–10** / **–5**), channel overload (*[Clip]*) and a fault condition (*[Fault]*).
3	*[CH-A]*, *[CH-B]* Input gain controls for channels A and B.

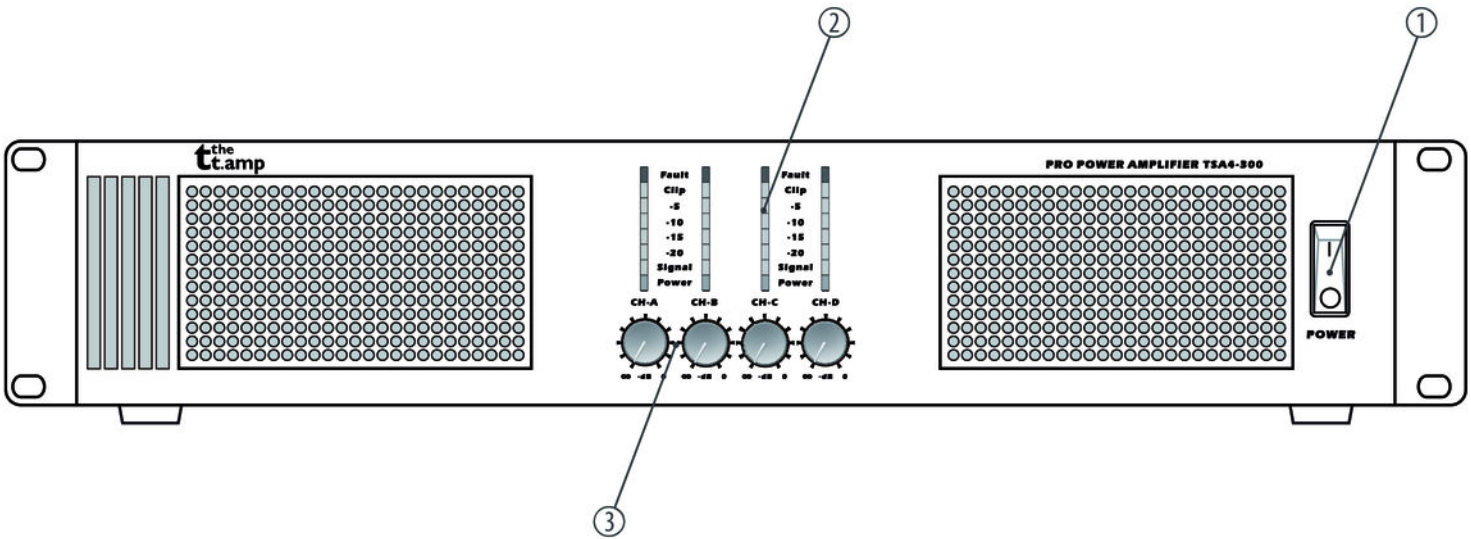
The LED [Power] lights permanently during operation. The LEDs [Signal] / [–20] / [–15] / [–10] / [–5] respond to the input signal. If any of these LEDs are lit without an input signal is present disconnect the speakers from the amplifier and turn the input gain controls of channels A and B down to minimum. If the LEDs will still light, the device must be checked by an authorized service workshop.

Rear panel TSA 1400, 2200, 4000



4	IEC chassis plug for the power supply.
5	*[OUTPUT CH-A]*, *[OUTPUT CH-B]* Signal outputs, designed as lockable NL4 chassis socket to connect speakers.
6, 9	*[INPUT CH-A]*, *[INPUT CH-B]* Signal input channels, designed as XLR socket pair (input / output) to loop the audio signal to other devices.
7	Push-button *[Stereo | Bridge]* Switch for operating modes 'Stereo' (channels operate independently of each other) and 'Bridge' (two channels are interconnected to form one channel with double output).
8	Push-button *[Lift | Ground]* Use the Ground / Lift switch to separate the connection between the earth pin of the device and the unit's signal ground to prevent ground loops: ■ 'Lift' position (not pressed): no connection ■ 'Ground' position (pressed): earth pin and signal ground are electrically connected

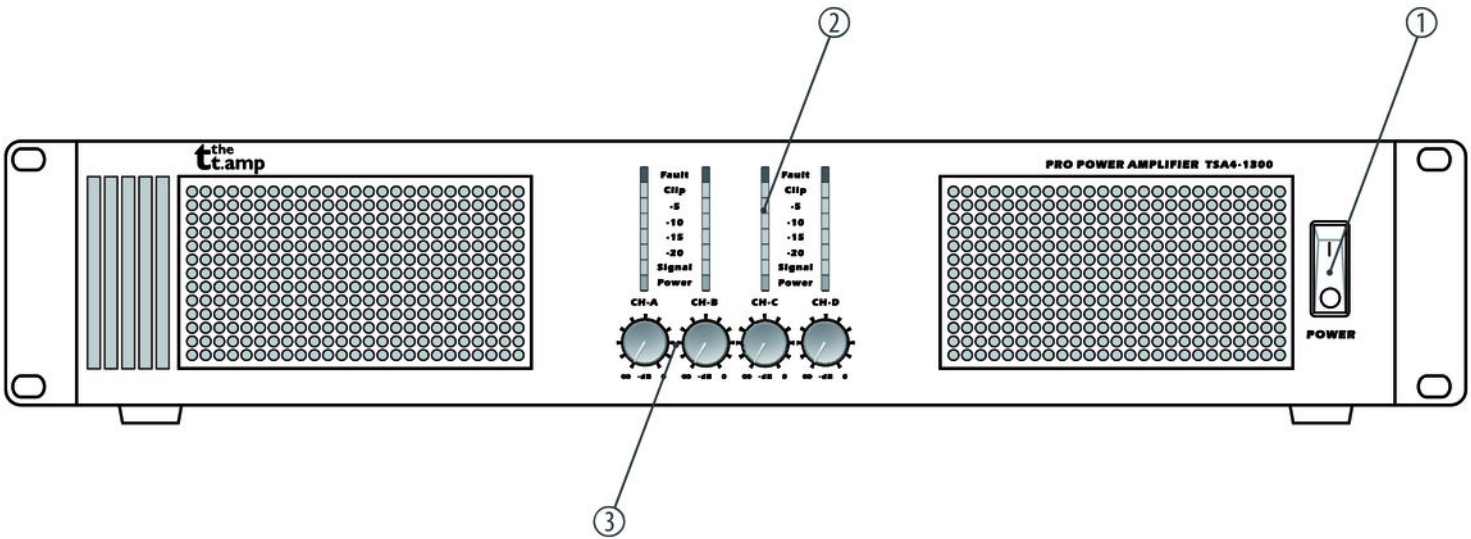
Front panel TSA 4-300



1	*[POWER]* Main switch to turn the device on and off.
2	LED indicators *[CH-A]* … *[CH-D]* These LEDs indicate that the unit is operational (*[Power]*), the input signal level (*[Signal]* / **–20** / **–15** / **–10** / **–5**), channel overload (*[Clip]*) and a fault condition (*[Fault]*).
3	*[CH-A]* … *[CH-D]* Input gain controls for channels A to D.

The LED [Power] lights permanently during operation. The LEDs [Signal] / [–20] / [–15] / [–10] / [–5] respond to the input signal. If any of these LEDs are lit without an input signal is present disconnect the speakers from the amplifier and turn the input gain controls of channels A to D down to minimum. If the LEDs will still light, the device must be checked by an authorized service workshop.

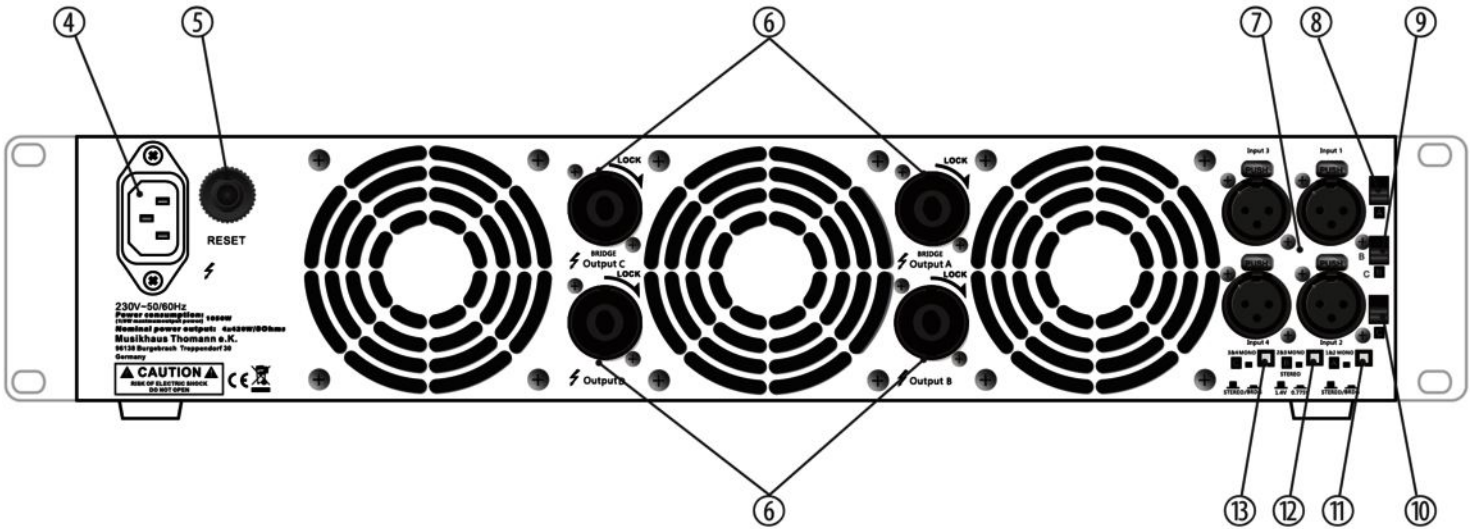
Front panel TSA 4-1300



1	*[POWER]* Main switch to turn the device on and off.
2	LED indicators *[CH-A]* … *[CH-D]* These LEDs indicate that the unit is operational (*[Power]*), the input signal level (*[Signal]* / **–20** / **–15** / **–10** / **–5**), channel overload (*[Clip]*) and a fault condition (*[Fault]*).
3	*[CH-A]* … *[CH-D]* Input gain controls for channels A to D.

The LED [Power] lights permanently during operation. The LEDs [Signal] / [–20] / [–15] / [–10] / [–5] respond to the input signal. If any of these LEDs are lit without an input signal is present disconnect the speakers from the amplifier and turn the input gain controls of channels A to D down to minimum. If the LEDs will still light, the device must be checked by an authorized service workshop.

**Rear panel TSA 4-300,
TSA 4-1300**



4	IEC chassis plug for the power supply.
5	*[RESET]* Push-button to reset the unit, for example, after the built-in automatic fuse has tripped.
6	*[OUTPUT CH-A] … [OUTPUT CH-D]* Signal outputs, designed as lockable NL4 chassis socket to connect speakers.
7	*[INPUT 1] … [INPUT 4]* XLR signal input sockets.
8	*[A]* Slide switch; determines how the input signals 1 and 2 are processed. In the upper switch position, the signals are fed separately to the power amps. In the lower switch position, the signals are added and fed as a mono sum signal to the power amps. The connection of the power amps is set by the push-button (11).
9	*[B]* Slide switch; determines how the input signals 2 and 3 are processed. In the upper switch position, the signals are fed separately to the power amps. In the lower switch position, the signals are added and fed as a mono sum signal to the power amps.

10	*[C]* Slide switch; determines how the input signals 3 and 4 are processed. In the upper switch position, the signals are fed separately to the power amps. In the lower switch position, the signals are added and fed as a mono sum signal to the power amps. The connection of the power amps is set by the push button (13).
11	Push-button for switching the operating mode of the power amps for the output channels A and B. ■ Push-button not pressed: Input signals 1 and 2 (connection depends on the position of switch *[A]* (8)) are being amplified in 'stereo' mode and separately fed to outputs A and B. The volume for output A and output B can be controlled separately with the controls for channel A or B (3). Wiring of the NL4 output sockets: Plus terminal = 1+, minus terminal = 1–. ■ Push-button is pressed: Both power amps operate in 'Bridge' mode like one power amplifier with double output power. Input signals 1 and 2 (connection depends on the position of switch *[A]* (8)) are being amplified. The output signal is present only at output A, the volume is controlled by the control for channel A (3). Wiring of the NL4 output sockets: Plus terminal = 1+, minus terminal = 2+.

12	The input sensitivity at which the amplifier is delivering its full rated power, can be set with this push-button between 0.775 V_{RMS} (not pressed) and 1.4 V_{RMS} (pressed).
13	Push-button for switching the operating mode of the power amps for the output channels C and D. ■ Push-button not pressed: Input signals 3 and 4 (connection depends on the position of switch *[C]* (10)) are being amplified in 'stereo' mode and separately fed to outputs C and D. The volume for output C and output D can be controlled separately with the controls for channel C or D (3). Wiring of the NL4 output sockets: Plus terminal = 1+, minus terminal = 1–. ■ Push-button is pushed: Both power amps operate in 'Bridge' mode like one power amplifier with double output power. Input signals 3 and 4 (connection depends on the position of switch *[C]* (8)) are being amplified. The output signal is present only at output C, the volume is controlled by the control for channel C (3). Wiring of the NL4 output sockets: Plus terminal = 1+, minus terminal = 2+.

6 Current consumption

The following table contains information on the typical current consumption depending on the output power level (root mean square value A_{RMS}). All values refer to a supply voltage of 220 V. With a supply voltage of 230 V the data must be multiplied by factor 0.96, with 120 V by factor 1,83 and with 100 V by factor 2.2.

TSA 4-700

Load	1/8 power (pink noise)	1/3 power (pink noise)	Full power (sine wave)
(4 ×) 8 Ω	400 W / 3.1 A	860 W / 5.8 A	1400 W / 9.5 A
(4 ×) 4 Ω	650 W / 4.4 A	1500 W / 9.8 A	2450 W / 15.4 A
(4 ×) 2 Ω	950 W / 6.4 A	1800 W / 11.6 A	3100 W / 20 A
(2 ×) 8 Ω, bridged	620 W / 4.3 A	2450 W / 15 A	2450 W / 15 A
(2 ×) 4 Ω, bridged	870 W / 6.1 A	3300 W / 19.5 A	3300 W / 19.5 A

TSA 1400

Load	1/8 power (pink noise)	1/3 power (pink noise)	Full power (sine wave)
(2 ×) 8 Ω	330 W / 1.93 A	734 W / 4.4 A	1400 W / 7.74 A
(2 ×) 4 Ω	480 W / 2.86 A	1200 W / 6.9 A	2300 W / 12.2 A
(2 ×) 2 Ω	700 W / 4.1 A	1313 W / 7.2 A	3345 W / 17.3 A
8 Ω, bridged	500 W / 3.0 A	1200 W / 6.9 A	2300 W / 12.4 A
4 Ω, bridged	984 W / 5.4 A	2690 W / 14.2 A	3310 W / 17.2 A

TSA 2200

Load	1/8 power (pink noise)	1/3 power (pink noise)	Full power (sine wave)
(2 ×) 8 Ω	260 W / 1.69 A	400 W / 2.73 A	1700 W / 9.5 A
(2 ×) 4 Ω	680 W / 4.0 A	1180 W / 6.5 A	2800 W / 14.97 A

Load	1/8 power (pink noise)	1/3 power (pink noise)	Full power (sine wave)
(2 ×) 2 Ω	850 W / 5.0 A	1800 W / 9.8 A	4200 W / 21 A
8 Ω, bridged	680 W / 4.1 A	1200 W / 6.8 A	2850 W / 15.2 A
4 Ω, bridged	820 W / 4.5 A	1900 W / 10.1 A	4600 W / 23 A

TSA 4000

Load	1/8 power (pink noise)	1/3 power (pink noise)	Full power (sine wave)
(2 ×) 8 Ω	475 W / 3.7 A	974 W / 6.8 A	2732 W / 17 A
(2 ×) 4 Ω	708 W / 5.1 A	1640 W / 11 A	4018 W / 26 A
(2 ×) 2 Ω	–	–	–
8 Ω, bridged	677 W / 5 A	1520 W / 10.2 A	4346 W / 27 A
4 Ω, bridged	–	–	–

TSA4-300

Load	1/8 power (pink noise)	1/3 power (pink noise)	Full power (sine wave)
(4 ×) 8 Ω	420 W / 3.2 A	1050 W / 7.5 A	1960 W / 13.6 A
(4 ×) 4 Ω	700 W / 5.2 A	1810 W / 12.5 A	2250 W / 21.7 A
2 ×8 Ω, bridged	706 W / 5.6 A	1847 W / 13.1 A	3438 W / 22.8 A

TSA4-1300

Load	1/8 power (pink noise)	1/3 power (pink noise)	Full power (sine wave)
(4 ×) 8 Ω	1050 W / 7.5 A	2920 W / 18.7 A	6503 W / 39.4 A
(4 ×) 4 Ω	1580 W / 10.7 A	4230 W / 25.8 A	9410 W / 53 A
2 ×8 Ω, bridged	1631 W / 11.8 A	4450 W / 28.7 A	9020 W / 52.4 A

7 Technical specifications

TSA 4-700

Load impedance	8 Ω	4 Ω	2 Ω
Rated output power (THD ≤1 %, 1 kHz)	4 × 490 W	4 × 810 W	4 × 930 W
Max. output power 'bridged' (THD ≤1 %, 1 kHz)	2 × 1600 W	2 × 1800 W	–
Max. voltage swing (RMS) (THD ≤1 %, 1 kHz)	62.6 V		
Slew rate (1 kHz)	38 V/µs		
THD	< 0.1 %		
IMD-SMPTE (60 Hz, 7 kHz)	< 0.1 %		
DIM 30 (3.15 kHz, 15 kHz)	< 0.1 %		
Crosstalk (ref. 1 kHz, 10 % rated power)	> 70 dB		
Frequency response (ref. 1 kHz)	20 Hz … 20 kHz (0 – 2 dB)		

Input impedance (20 Hz - 20 kHz, balanced)	20 kΩ (balanced) 10 kΩ (unbalanced)
Input sensitivity (rated power output, 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 400
Voltage amplification	38,4 dB
Signal-to-noise ratio	105 dB (A-weighted)
Protective circuits	Temperature, short circuit, limiter
Cooling	front to rear
Operating supply voltage	AC 230 V ~ , 50/60 Hz
Power consumption	see *Chapter 6 'Current consumption' on page 31*
Dimensions (W × H × D)	488 mm × 97 mm × 370 mm
Weight	10.7 kg

TSA 1400

Load impedance	8 Ω	4 Ω	2 Ω
Rated output power (THD ≤1 %, 1 kHz)	2 × 450 W	2 × 670 W	2 × 800 W
Max. output power 'bridged' (THD ≤1 %, 1 kHz)	1 × 1380 W	1 × 1600 W	–
Max. voltage swing (RMS) (THD ≤1 %, 1 kHz)	60 V		
Slew rate (1 kHz)	35 V/µs		
THD	< 0.1 %		
IMD-SMPTE (60 Hz, 7 kHz)	< 0.1 %		
DIM 30 (3.15 kHz, 15 kHz)	< 0.1 %		
Crosstalk (ref. 1 kHz, 10 % rated power)	> 70 dB		
Frequency response (ref. 1 kHz)	20 Hz … 20 kHz (0 – 2 dB)		

Input impedance (20 Hz - 20 kHz, balanced)	20 kΩ (balanced) 10 kΩ (unbalanced)
Input sensitivity (rated power output 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 400
Voltage amplification	38,3 dB
Signal-to-noise ratio	105 dB (A-weighted)
Protective circuits	Temperature, short circuit, limiter
Cooling	front to rear
Operating supply voltage	AC 230 V ~ , 50/60 Hz
Power consumption	see *Chapter 6 'Current consumption' on page 31*
Dimensions (W × H × D)	484 mm × 97 mm × 370 mm
Weight	10.6 kg

TSA 2200

Load impedance	8 Ω	4 Ω	2 Ω
Rated output power (THD ≤1 %, 1 kHz)	2 × 590 W	2 × 910 W	2 × 1200 W
Max. output power 'bridged' (THD ≤1 %, 1 kHz)	1 × 1800 W	1 × 2400 W	–
Max. voltage swing (RMS) (THD ≤1 %, 1 kHz)	68.7 V		
Slew rate (1 kHz)	41 V/µs		
THD	< 0.1 %		
IMD-SMPTE (60 Hz, 7 kHz)	< 0.1 %		
DIM 30 (3.15 kHz, 15 kHz)	< 0.1 %		
Crosstalk (ref. 1 kHz, 10 % rated power)	> 70 dB		
Frequency response (ref. 1 kHz)	20 Hz … 20 kHz (0 – 2 dB)		

Input impedance (20 Hz - 20 kHz, balanced)	20 kΩ (balanced) 10 kΩ (unbalanced)
Input sensitivity (rated power output 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 400
Voltage amplification	39,8 dB
Signal-to-noise ratio	105 dB (A-weighted)
Protective circuits	Temperature, short circuit, limiter
Cooling	front to rear
Operating supply voltage	AC 230 V ~ , 50/60 Hz
Power consumption	see *Chapter 6 'Current consumption' on page 31*
Dimensions (W × H × D)	485 mm × 97 mm × 370 mm
Weight	10.4 kg

TSA 4-300

Load impedance	8 Ω	4 Ω
Rated output power (THD ≤1 %, 1 kHz)	4 × 350 W	4 × 550
Max. output power 'bridged' (THD ≤ 1 %, 1 kHz)	2 × 1000 W	–
THD	< 0.5 %	
IMD-SMPTE (60 Hz, 7 kHz)	≤ 0.35 %	
Crosstalk (at 1 kHz)	–75 dB	
(at 20 kHz)	–58 dB	
Frequency response (1 W)	20 Hz … 20 kHz (0 – 1 dB)	
Input impedance	20 kΩ (balanced) 10 kΩ (unbalanced)	
Input sensitivity (rated power output 1 kHz)	0.775 V / 1.4 V, (switchable)	
Damping factor (10 Hz / 400 Hz, 8 Ω)	> 200	

Voltage amplification	35.3 dB
Signal-to-noise ratio	> 100 dB (A-weighted)
Protection circuits against	short circuit, missing load, cracking when turning on and off, radio interference
Cooling	Internal heat dissipation with forced ventilation through controlled fan, overheating protection
Ventilation	front to rear
Operating supply voltage	AC 230 V ~ , 50/60 Hz
Power consumption	see *Chapter 6 'Current consumption' on page 31*
Dimensions (W × H × D)	482 mm × 88 mm × 227 mm
Weight	7.5 kg

TSA 4-1300

Load impedance	8 Ω	4 Ω
Rated output power (THD ≤1 %, 1 kHz)	4 × 1220 W	4 × 1670
Max. output power 'bridged' (THD ≤1 %, 1 kHz)	2 × 4000 W	–
THD	< 0.5 %	
IMD-SMPTE (60 Hz, 7 kHz)	≤ 0.35 %	
Crosstalk (at 1 kHz)	–75 dB	
(at 20 kHz)	–58 dB	
Frequency response (1 W)	20 Hz … 20 kHz (0 – 1 dB)	
Input impedance	20 kΩ (balanced) 10 kΩ (unbalanced)	
Input sensitivity (rated power output 1 kHz)	0.775 V / 1.4 V, (switchable)	
Damping factor (10 Hz / 400 Hz, 8 Ω)	> 200	

Voltage amplification	37.8 dB
Signal-to-noise ratio	> 100 dB (A-weighted)
Protection circuits against	short circuit, missing load, cracking when turning on and off, radio interference
Cooling	Internal heat dissipation with forced ventilation through controlled fan, overheating protection
Ventilation	front to rear
Operating supply voltage	AC 230 V ~ , 50/60 Hz
Power consumption	see *Chapter 6 'Current consumption' on page 31*
Dimensions (W × H × D)	482 mm × 88 mm × 380 mm
Weight	12.5 kg

TSA 4000

Load impedance	8 Ω	4 Ω	2 Ω
Nominal power output (THD ≤1 %, 1 kHz)	2 × 1000 W	2 × 1500	–
Max. power output, bridged mode (THD ≤1 %, 1 kHz)	1 × 2865 W	–	–
Max. voltage increase (RMS) (THD ≤1 %, 1 kHz)	89 V		
Slew rate (1 kHz)	50 V/µs		
Total harmonic distortion (THD)	< 0,1 %		
IMD-SMPTE (60 Hz, 7 kHz)	< 0,35 %		
DIM 30 (3.15 kHz, 15 kHz)	< 0,35 %		
Crosstalk (at 1 kHz, 10 % nominal power)	< –80 dB		
Frequency response (at 1 kHz)	20 Hz … 20 kHz (0 – 2 dB)		

Input impedance (20 Hz – 20 kHz, balanced)	20 kΩ (balanced) 10 kΩ (unbalanced)
Input sensitivity (nominal power output, 1 kHz)	1 V
Damping factor (100 Hz / 1 kHz, 8 Ω)	> 450
Voltage amplification	37 dB
Signal-to-noise ratio (SNR)	106 dB (A-weighted)
Protective circuits	Thermal, short circuit, limiter
Cooling	from front to back
Mains power supply	230 V ~ (AC), 50/60 Hz
Power consumption	see *Chapter 6 'Current consumption' on page 31*
Dimensions (W × H × D)	483 × 88 × 420 mm (19.02 × 3.46 × 1.53 inches)
Weight	12 kg (26.5 lbs)

8 Plug and connection assignment

Introduction

This chapter will help you select the right cables and plugs to connect your valuable equipment in such a way that a perfect sound experience is ensured.

Please note these advices, because especially in 'Sound & Light' caution is indicated: Even if a plug fits into the socket, an incorrect connection may result in a destroyed power amp, a short circuit or 'just' in poor transmission quality!

Balanced and unbalanced transmission

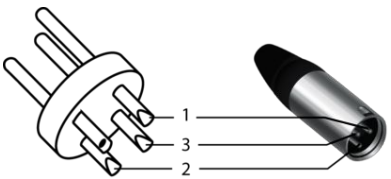
Unbalanced transmission is mainly used in semi-professional environment and in hifi use. Instrument cables with two conductors (one core plus shielding) are typical representatives of the unbalanced transmission. One conductor is ground and shielding while the signal is transmitted through the core.

Unbalanced transmission is susceptible to electromagnetic interference, especially at low levels, such as microphone signals and when using long cables.

In a professional environment, therefore, the balanced transmission is preferred, because this enables an undisturbed transmission of signals over long distances. In addition to the conductors 'Ground' and 'Signal', in a balanced transmission a second core is added. This also transfers the signal, but phase-shifted by 180°.

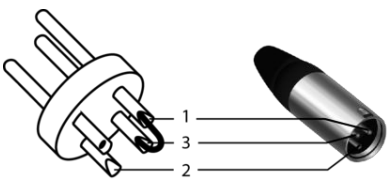
Since the interference affects both cores equally, by subtracting the phase-shifted signals, the interfering signal is completely neutralized. The result is a pure signal without any noise interference.

XLR plug (balanced)



1	Ground, shielding
2	Signal (in phase, +)
3	Signal (out of phase, –)

XLR plug (unbalanced)



1	Ground, shielding
2	Signal
3	Bridged to pin 1

NL4 mounting connectors

1, +	Signal 1 (in phase)
1, –	Signal 1 (180 degree phase shift)
2, +	Signal 2 (in phase)
2, –	Signal 2 (180 degree phase shift)

9 Cleaning

Fan grids

The fan grids of the device must be cleaned on a regular basis to remove dust and dirt. Before cleaning, switch off the device and disconnect AC-powered devices from the mains. Use a lint-free damp cloth for cleaning. Never use solvents or alcohol for cleaning.

10 Protecting the environment

Disposal of the packaging material

For the transport and protective packaging, environmentally friendly materials have been chosen that can be supplied to normal recycling.

Ensure that plastic bags, packaging, etc. are properly disposed of.

Do not just dispose of these materials with your normal household waste, but make sure that they are collected for recycling. Please follow the notes and markings on the packaging.

Disposal of your old device

This product is subject to the European Waste Electrical and Electronic Equipment Directive (WEEE). Do not dispose with your normal household waste.

Dispose of this device through an approved waste disposal firm or through your local waste facility. When discarding the device, comply with the rules and regulations that apply in your country. If in doubt, consult your local waste disposal facility.